

ONS00501
10/623,397REMARKS

Claims 1-20 are in the application. Claims 10-16 have been withdrawn from consideration. The allowable subject matter of claims 5, 6 and 9 is noted.

By this amendment, claims 1 and 17 have been amended to more particularly set out applicant's invention. FIG. 1 supports these changes. Additionally, the specification has been amended to address several minor typographical errors.

Summary of February 25, 2004 Telephone Election

On February 25, 2004, Examiner Soward contacted the undersigned attorney regarding a species restriction for the present application. The undersigned elected claims 1-9 with traverse, not without traverse as stated in the present Office Action. Correction of the record is respectfully requested regarding applicant's election with traverse.

Response to Restriction Requirement

The restriction requirement indicates that the present application contains claims directed to the following patentably distinct species of the claimed invention: claims 1-9 (Vertical FET Device), claims 10-16 (Semiconductor Switching Device), and claims 17-20 (Compound Semiconductor Vertical FET Device). A provisional election of claims 1-9 is hereby confirmed; however, applicant traverses the restriction with respect to claims 17-20 as being improper in view of the remarks presented hereinafter. Applicant

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elects not to traverse the restriction requirement related to claims 10-16.

Applicant notes that restriction is never mandatory and is discretionary under 35 U.S.C. §121 only "when two or more independent and distinct" inventions are claimed. In the instant case, applicant respectfully submits that the species of claims 1-9 and 17-20 are not patentably distinct because both sets of claims are readable on FIGS. 1-6. In addition, applicant submits that claim 17 is not distinct in view of claims 1 and 3 since GaAs and InP are examples of compound semiconductor materials, and a prior art search related to claims 1-9 would be sufficient in regards to claims 17-20. Thus, applicant respectfully submits that there is not valid ground for restricting claims 17-20.

Confirmation of the election of claims 1-9 is hereby made. However, the restriction requirement with respect to claims 17-20 is traversed, and reconsideration and withdrawal of the restriction requirement with respect to claims 17-20 is respectfully requested. Applicant's attorney would appreciate a telephone call regarding claims 17-20 if the Examiner maintains her position with respect to those claims.

Response to Objection to Applicant's Declaration

In the present Office Action, the examiner objects to the applicant's declaration under 35 U.S.C. 119(e) or 120 for failing to properly reference an earlier filed application. However, applicant respectfully submits that he is not seeking priority from such an application, and that paragraphs [0001] and [0002] simply make reference to two other co-pending applications that are applicant's, and

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that were filed on the same day as the present application. The other two co-pending applications are incorporated by reference, but are not relied on for priority. Applicant respectfully requests withdrawal of this objection.

Response to Objection to Drawings

The Examiner's objection to the originally filed informal drawings is noted. Applicant mailed formal drawings to the PTO for the present application on February 25, 2004.

Response to First 35 U.S.C. §103 Rejection

Claim 1 was rejected under §103 as being unpatentable over Kocon et al., U.S. 6,673,681, (hereinafter "Kocon") in view of Fujishima et al., Patent Application Publication 2002/0112363 A1 (hereinafter "Fujishima"). This rejection is respectfully traversed in view of the amendments made herein and the remarks presented hereinafter.

Claim 1 calls for a vertical FET device including, among other things, first and second trenches that form a first trench structure, and a first doped gate region formed in at least a portion of second sidewalls and a second bottom surface of the first trench structure, wherein the doped gate region comprises a second conductivity type, and wherein the first doped gate region extends into the body of semiconductor material.

Applicant respectfully submits that the Kocon reference does not show or suggest, among other things, a first doped gate region of a second conductivity type formed in at least

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a portion of the second sidewalls and second bottom surface of the first trench structure and extending into the body of semiconductor material as is called for in claim 1. More specifically, in Kocon the doped polysilicon gate 207 is separated from the semiconductor material by dielectric layer 205. Thus, the Kocon reference fails to show or suggest at least one express element of claim 1.

Additionally, the Fujishima reference does not make up for the deficiencies of the Kocon reference. Like Kocon, the Fujishima gate structure is an insulated gate structure where the doped polysilicon gate layer 82 is separated from the semiconductor material by a dielectric layer (see paragraph [0077]). Since both references teach insulated gate structures and not a doped gate region extending into the body of semiconductor material as is called for in claim 1, applicant respectfully submits that these references fail to make claim 1 obvious.

Claim 17 calls for among other things, a first groove formed in a compound semiconductor layer of a first conductivity type, wherein the first groove has first sidewalls and a first lower surface, and wherein the first groove extends from a first surface of the compound semiconductor layer; a second groove formed within the first groove, wherein the second groove has second sidewalls and a second lower surface; and a doped gate region formed in the second lower surface and at least a portion of the second sidewalls and extending into the compound semiconductor layer.

Applicant respectfully submits that claim 17 is allowable over Kocon and Fujishima because neither reference, either singularly or in combination, shows or suggests a doped gate region of a second conductivity type

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formed in the second lower surface and at least a portion of the second sidewalls of a second groove and extending into the compound semiconductor layer as claimed.

Response to Second 35 U.S.C. §103 Rejection

Claims 2-3 and 7-8 were rejected under §103(a) as being unpatentable over Kocon and Fujishima as applied to claim 1, and further in view of Chatterjee et al., U.S. 5,208,657 (hereinafter "Chatterjee"). This rejection is respectfully traversed in view of the amendments made herein and the remarks presented hereinafter.

Claims 2-3 and 7-8 depend from claim 1. The Chatterjee reference pertains to a DRAM cell with a trench capacitor. Applicant respectfully submits that the Chatterjee reference does not make up for the deficiencies of the Kocon and Fujishima references as outlined above, and thus, the combination of Kocon, Fujishima, and Chatterjee fails to make claims 2-3 and 7-8 obvious.

Page 7 of the present office action makes reference to Niu et al with respect to claims 7-8. The Niu reference pertains to a method of planarization. Applicant respectfully believes that the Niu reference is not related to the present invention as set forth in claims 7 and 8, and that reliance on this reference was inadvertent for these claims. Applicant appreciates any clarification from the Examiner if applicant is mistaken in that belief.

Claims 18-20 depend from claim 17 are believed allowable over Kocon, Fujishima, and Chatterjee for at least the same reasons as claims 17, 2-3, and 7-8.

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Claim 4 was rejected under §103(a) as being unpatentable over Kocon and Fujishima as applied to claim 1, and further in view of Niu.

Claim 4 depends from claim 1. The Niu reference pertains to a method of planarization. Applicant respectfully submits that the Niu reference does not make up for the deficiencies of the Kocon and Fujishima references as outlined above, and thus, the combination of Kocon, Fujishima, and Niu fails to make claim 4 obvious.

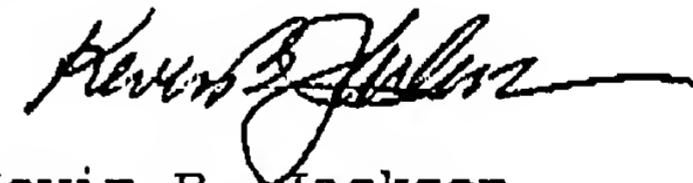
Conclusion

Applicant has reviewed the other references cited, and respectfully submits that the other references fail to make up for the deficiencies stated herein.

In view of all of the above, it is believed that the claims are allowable, and the case is in condition for allowance, which action is earnestly solicited.

Respectfully submitted,

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